REMARKS

Claims 1-20 are pending in the application.

Claims 1, 8 and 18 are amended herein. Support for the amendment of claims 1 and 8 is found, for example, at page 22, lines 4-5 and from page 17, line 29 to page 18, line 7. An obvious typographical error is corrected in claim 18.

An obvious typographical error is corrected in the specification at page 15.

Applicants request entry of the present Reply after final because it renders all of the claims allowable and overcomes all of the rejections set forth in the Office action to which this paper is responsive. Applicants submit that the present amendments do not raise new issues that would require further search and/or consideration, that the amendments should be entered and the claims allowed.

Applicants consider that the presently submitted amended claims do not constitute a narrowing amendment because the amendments merely clarify what was already inherent in the claims, based on the disclosure in the specification. Furthermore, this clarifying amendment is necessitated by the Examiner's overly and unduly broad reading of Applicants' claims.

For the reasons set forth below, Applicants respectfully request reconsideration of the application, withdrawal of the asserted rejections of Applicants' claims, and allowance of all presently pending claims.

Response to Arguments of Examiner in Final Office Action

In the final Office action, the Examiner contends that, being charged with reading Applicants' claims broadly. The Examiner cited MPEP §2111 for the proposition that during prosecution the pending claims must be given their broadest reasonable interpretation. Applicants acknowledge this general principle, but Applicants respectfully submit that the Examiner's broad interpretation is overly and unduly broad and therefore is not reasonable. The Examiner stated:

> Specifically, in the Independent claims of the application, applicant claims a process of forming a bottom layer and a top layer of oxide for the concentrations of oxygen and nitrogen. While some may assume that the bottom and top layers of oxide are of equal thickness with the dividing line equally bisecting the two, examiner must consider the claims more broadly. As can be seen in fig. 4A [of Yang et al.], from the depth to approximately 40 Å, the oxygen concentration exceeds the nitrogen concentration. With the dividing line between the lower and the upper oxide layers resides in certain areas up to the depth to approximately 40 Å below the top surface of the oxides, the observer may produce a bottom oxide layer where the total concentration of oxygen exceeds the total concentration of nitrogen, as necessary for the independent claims.

As the foregoing statement is understood, it appears to contend that Applicants' claims do not distinguish over Yang et al. because the claims can be read to require only a single region following the step of adding a quantity of nitrogen to the bottom oxide layer. If this is the Examiner's contention, Applicants disagree. This interpretation of the claims is not reasonable, because the originally filed claims clearly recite that there are two regions formed in the bottom oxide layer, that the concentration of nitrogen in the second region exceeds the concentration of nitrogen in the first region, and that the concentration of nitrogen in the second region does not exceed the concentration of oxygen in the second region. Thus, as stated in original claim 15, for example, the bottom oxide layer, following the step of adding a quantity of nitrogen to the originally formed bottom oxide layer, comprises a first region adjacent the charge storage layer and a second region adjacent the substrate/oxide interface, the first region comprising a material having a general formula $Si_xO_yN_{z1}$, the second region comprising a material having a general formula $Si_xO_yN_{z2}$, wherein x, y, z1 and z2 are atomic percentages, and $y > z2 > z1$. This relationship clearly states that there are two regions in the bottom oxide layer, characterized by, inter alia, the atomic percentage relationship y > z2 > z1.

However, in order to advance the prosecution of the application, and because Applicants do not consider the clarifying amendment of claims 1 and 8 to narrow the scope of the claims but instead to explicitly state what was inherently present in the originally filed claims, Applicants amend herein claims 1 and 8 to make clear that the first region substantially retains its original nitrogen concentration. Applicants do not make such amendment to claim 15, which already states that the bottom oxide layer in the claimed device comprises a first region comprising a material having a general formula $Si_xO_yN_{z1}$, and a second region comprising a material having a general formula $Si_xO_yN_{z2}$, wherein x, y, z1 and z2 are atomic percentages, and y > z2 > z1. This limitation, and the clarifying terms added to claims 1 and 8, specifies that in Applicants' claimed method and structure, the bottom oxide layer comprises two regions, one having a greater nitrogen content than the other, and the nitrogen content of both regions of the bottom oxide layer at no time exceeds the oxygen content of both regions.

This feature of the Applicants' claimed invention clearly distinguishes over the disclosure of Yang et al. As clearly disclosed by Yang et al., in Figs. 4a and 4b, there is always a portion of the disclosed bottom oxide structure in which the nitrogen concentration exceeds the oxygen concentration in the bottom oxide layer, following the step of adding nitrogen to this layer.

If a graph of the relative concentrations of oxygen, nitrogen and silicon, corresponding to Figs. 4a and 4b of Yang et al., was prepared for Applicants' claimed invention, the concentration curve of nitrogen would have a shape similar to that in Yang et al., that is, starting low and then increasing to a peak at some depth, but the peak concentration of nitrogen (e.g., the peaks shown at depths of about 55 Å in the nitrogen concentration curves in Fig. 4a and about 45-50 Å in Fig. 4b) would remain below the oxygen concentration curve, even at its increased concentration in the second region. Thus, for example, in such a hypothetical graph of Applicants' claimed bottom oxide layer, if the nitrogen concentration in the first region was similar to that shown in Fig. 4a of Yang et al. (i.e. to about 30 Å, in which the oxygen concentration is about 1E+20.2), estimated for the sake of argument to be about 1E+19.5, the increased nitrogen concentration added to the second region (i.e., peaking at about 55 Å) would be estimated for the sake of argument to be about 1E+20, that is, greater than in the first region but below the oxygen concentration line at all times. This "thought experiment" shows that Applicants' claimed invention is fully distinct from the disclosure of Yang et al. and is neither anticipated nor rendered obvious thereby. As disclosed throughout Applicants' specification, the nitrogen is added to reduce the number of, e.g., Si-H bonds and Si dangling bonds, and only a relatively small quantity of nitrogen needs to be added to do so.

Therefore, Applicants respectfully submit that Yang et al. does not and cannot either anticipate or render obvious Applicants' claimed invention.

Applicants incorporate herein by reference, as if fully restated in their entirety, the Remarks set forth in the Reply to Office Action which was filed by Applicants in response to the Office Action dated 21 September 2004.

For the foregoing reasons, Applicants respectfully submit that the presently pending claims are in condition for allowance, and respectfully request notice to such effect.

In the alternative, if Applicants' understanding of the Examiner's position quoted above is not correct, Applicants request the Examiner to telephone the undersigned attorney to discuss and clarify the Examiner's position.

CONCLUSION

For the foregoing reasons, Applicants respectfully submit that all of the presently pending claims patentably distinguish over the prior art generally, and over

Yang et al. in particular, and that all of Applicants' claims are therefore in condition for allowance. Applicants request the Examiner to so indicate.

If the Examiner considers that a telephone interview would be helpful to facilitate favorable prosecution of this application, the Examiner is invited to telephone the undersigned at the Examiner's convenience. Should a Petition for Extension of Time be necessary for the present Reply to the outstanding Office action to be timely filed (or if such a petition has been made and an additional extension is necessary) petition therefor is hereby made and, if any additional fees are required for the filing of this paper, the Commissioner is authorized to charge those fees to Deposit Account #18-0988, Docket No. AF01191.

Respectfully submitted,

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